

# **NOTICE**

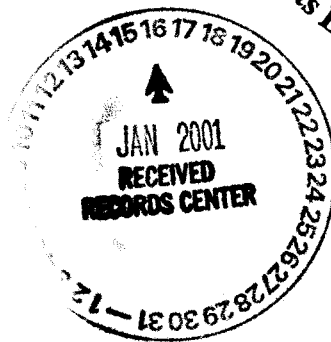
**All drawings located at the end of the document.**

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01-RF-00076  
JLB-001-01



# Operable Unit 1 – 881 Hillside Area French Drain Decommissioning Closeout Report



December 2000

ADMIN RECORD  
A-0001-001414

1/27

**FRENCH DRAIN DECOMMISSIONING PROJECT**  
**CLOSEOUT REPORT**

Rocky Flats Environmental Technology Site

December 12, 2000

## **TABLE OF CONTENTS**

	<u>Page</u>
1.0 INTRODUCTION.....	1
2.0 PROJECT BACKGROUND.....	1
3.0 FRENCH DRAIN DECOMMISSIONING .....	2
4.0 SITE RECLAMATION .....	3
5.0 WASTE DISPOSITION .....	4
6.0 EXISTING SITE CONDITION.....	4
7.0 REFERENCES.....	4

## **FIGURES**

FRENCH DRAIN SITE LOCATION MAP

FRENCH DRAIN OUT-FALL TRENCH AS-BUILT DRAWINGS

## **PHOTOGRAPHS**

FRENCH DRAIN DECOMMISSIONING PROJECT PHOTOGRAPHS

## **WASTE DOCUMENTATION**

FRENCH DRAIN WASTE DOCUMENTATION

## ACRONYM LIST

CAD/ROD	Corrective Action Decision/Record of Decision
CWTF	Consolidated Water Treatment Facility
gpm	gallons per minute
HDPE	High-Density Polyethylene
OU	Operable Unit
PVC	Polyvinyl Chloride
RFETS	Rocky Flats Environmental Technology Site
SID	South Interceptor Ditch
VOCs	Volatile Organic Compounds

## 1.0 INTRODUCTION

This report documents the completion of the Operable Unit (OU) 1 French Drain Decommissioning Project at the Rocky Flats Environmental Technology Site (RFETS). The French Drain is a groundwater collection system located on the southeast portion of RFETS (Figure 1). The French Drain project was executed in accordance with the OU 1 – 881 Hillside Area French Drain Decommissioning Project Work Plan (DOE 2000). Decommissioning the French Drain is part of the approved selected remedy for OU 1, presented in the Corrective Action Decision/Record of Decision (CAD/ROD) Declaration for Operable Unit 1 – 881 Hillside Area (DOE 1997).

The objectives of this project were to:

- De-energize and remove electrical components of the French Drain sump pump collection gallery;
- Excavate and remove two submerged sump pumps and one water-level sensor standpipe;
- Remove associated pipe and valves from one concrete vault;
- Breach the French Drain and excavate and install a new out-fall trench system;
- Backfill the trench and contour the site to grade; and
- Revegetate the project site.

The French Drain was removed from service on August 29, 2000.

## 2.0 PROJECT BACKGROUND

Construction of the French Drain occurred in 1992 to intercept groundwater potentially contaminated with volatile organic compounds (VOCs) from the OU 1 881 Hillside Area and prevent downgradient contaminant migration. The French Drain was constructed by excavating an east-west trending trench approximately 1,435 feet in length which is keyed into bedrock (Figure 1).

The downstream face of the French Drain is covered with a high-density polyethylene (HDPE) membrane. A polyvinyl chloride (PVC) collection pipe inside the drain directs flow under gravity to a six-foot-wide collection gallery sump. The collection gallery sump was equipped with two submersible pumps, that transferred the collected groundwater through underground piping to the RFETS Building 891 Consolidated Water Treatment Facility (CWTF). After treatment, the water was discharged to the South Interceptor Ditch (SID) located approximately 80 feet south of the east-west trending French Drain. One water-level sensor standpipe was installed between the two pumps, and one concrete meter/valve vault and two hydrants were located adjacent to the collection gallery sump.

Groundwater collected by the French Drain has been sampled quarterly since 1993. The water quality data do not indicate hazardous concentrations of volatile organic compounds or radiological contaminants. Analytical results of the groundwater collected from the French Drain indicate that groundwater contaminant concentrations are consistently below Rocky Flats Cleanup Agreement, Action

Level Framework Tier II groundwater action levels. Based on these data, it was determined that the French Drain would be decommissioned and its use for collecting and transferring groundwater would be discontinued.

Different options were evaluated for decommissioning the French Drain system. The emphasis of the evaluation was placed on passivity, durability, long-term operation, cost, erosional impacts, and impacts to slope stability at the site. A simple underground gravity flow conveyance from the French Drain sump to the SID was selected as the method for removing the French Drain from service. This option has the following advantages:

- Simple design
- Relatively easy to implement
- Cost effective
- Maintenance-free
- Drains the French Drain at its lowest elevation
- Minimal erosional impacts
- Minimal impact to slope stability
- Passive system
- Long-term solution.

### 3.0 FRENCH DRAIN DECOMMISSIONING

Decommissioning of the French Drain began in August 2000 and was completed in September 2000. The French Drain was taken out of service by removing the collection gallery sump pump system. The gravel-filled collection gallery sump was then breached by excavating an out-fall trench from the SID to the sump location. The out-fall trench was lined with geotextile and backfilled with drain rock, allowing groundwater collecting in the French Drain sump to flow by gravity from the sump into the out-fall trench and ultimately into the existing riprap of the SID. The out-fall trench as-built drawings are attached.

The electrical components of the French Drain collection gallery sump pump system were removed. These components consisted of the sump pump control panel and collection gallery bubbler panel (mounted to the concrete meter/valve vault) and associated conductors and conduit. Underground electrical cables and conductors running from the sump location to the pull box at Building 891 CWTF were disconnected and abandoned in-place.

All piping and valves were removed from inside the concrete vault and the resulting pipe openings were grouted. Following removal of the vault cover and access doors, the vault was backfilled with soil and covered with approximately 3 feet of compacted soil. The vault dimensions are approximately 7 feet by 7 feet by 6 feet deep.

Two submerged sump pumps and well assemblies and one water-level sensor standpipe were removed from the collection gallery sump location. Two frost-proof hydrants were also removed. The out-fall trench was excavated with a one-percent slope, approximately 80 feet from the north side of the SID to the French Drain sump location. Due to the southward sloping surface from the sump location to the SID, the trench was excavated at a variable depth of approximately 23 feet below ground surface at the sump

location, to the elevation of the SID bottom. The trench width averaged 4 feet wide near the SID to approximately 10 feet south of the sump location. The trench was excavated wider in the vicinity of the sump due to caving of soil.

The French Drain HDPE membrane was breached on the south side of the sump location to allow collected water to drain into the new out-fall trench. The out-fall trench was backfilled with 3/8-inch to 3/4-inch washed, round drain rock. Geotextile was installed around the drain rock and at all interfaces between the new out-fall trench and existing sump materials. The depth of drain rock varies with the length of the out-fall trench, from 7 feet at the trench-sump interface to 5-feet, 10-inches at the SID.

The French Drain sump was installed so that the groundwater elevation in the sump would be maintained at a constant level. When the water level in the sump rose to a key elevation above the sump bottom, the pumps automatically turned on and remained on until the water level dropped below the key elevation above the bottom of the sump. The bottom of the new out-fall trench intersects the French Drain sump at the approximate low groundwater elevation in the sump. Given the out-fall trench width and thickness of gravel deposited in the trench, the out-fall trench is capable of managing a flow rate of 80 gallons per minute (gpm). Based on historic groundwater volumes pumped from the French Drain sump, peak flow rate from the sump is estimated to be 2.2 gpm.

As an added measure to handle potential peak flow conditions, a 4-inch-diameter continuous length of slotted HDPE pipe was installed on top of the drain rock. The pipe was covered with an additional 1-foot (average) thickness of drain rock. Geotextile was then folded over the top of the drain rock and utility warning tape was placed on the geotextile. Placement of the pipe was originally intended from the centerline of the sump location to the SID. However, due to unsafe cave-in conditions in the excavated sump location, the inlet end of the pipe was placed south of the sump.

The out-fall trench was backfilled with excavated site soil. The soil was wetted and compacted in approximately 1-foot lifts to grade. Tensar geogrid was installed for soil reinforcement on the sloped end of the trench above the SID as shown on the as-built drawing.

#### **4.0 SITE RECLAMATION**

Site reclamation consisted of application of previously stripped and stockpiled topsoil to provide a cover of approximately 6 inches over the areas disturbed by the excavation activities. The site was then re-contoured to approximate pre-existing grade conditions. A native grass mixture specified by the RFETS Ecology Group was applied on October 30, 2000 using broadcast-seeding methods. A commercially available hydro-mulch was applied over all seeded areas.

#### **5.0 WASTE DISPOSITION**

Waste materials generated during the decommissioning activities consisted primarily of the removed French Drain collection gallery sump pump equipment and associated construction materials and debris. These waste materials were placed into a roll-off container for disposal at an off-site landfill as sanitary waste. An inventory of the project waste materials and associated documentation is attached to this report. No hazardous or radiological waste was generated during the project.



## 6.0 EXISTING SITE CONDITIONS

As described above, the site has been re-contoured to approximate pre-existing grade conditions and revegetated. Structures remaining at the site include one pull box containing electrical wiring for the OU 1 Collection Well and the concrete meter/valve vault. The pull box is attached with Unistrut supports to the north side of the buried concrete vault. The top of the pull box is approximately 3-1/2 feet above the upper surface of the north side of the vault.

Buried electrical cables for the French Drain collection gallery sump pumps are abandoned in-place. These cables run from the Building 891 Consolidated Water Treatment Facility to the northwest corner of the concrete vault. Original design drawings indicate that these buried cables and conduit run westward from the sump location; however, construction as-built drawings were not available to confirm the location and depth of the buried conductors at the time of decommissioning.

Several groundwater monitoring wells are also located in the vicinity of the new out-fall trench. These wells are currently monitored per the RFETS Integrated Monitoring Plan (DOE 1999).

## 7.0 REFERENCES

DOE 1997, *Corrective Action Decision/Record of Decision for Operable Unit 1 881 Hillside Area*, Jefferson County, Colorado, February.

DOE 1999, *Rocky Flats Environmental Technology Site Integrated Monitoring Plan*, Golden, Colorado, September.

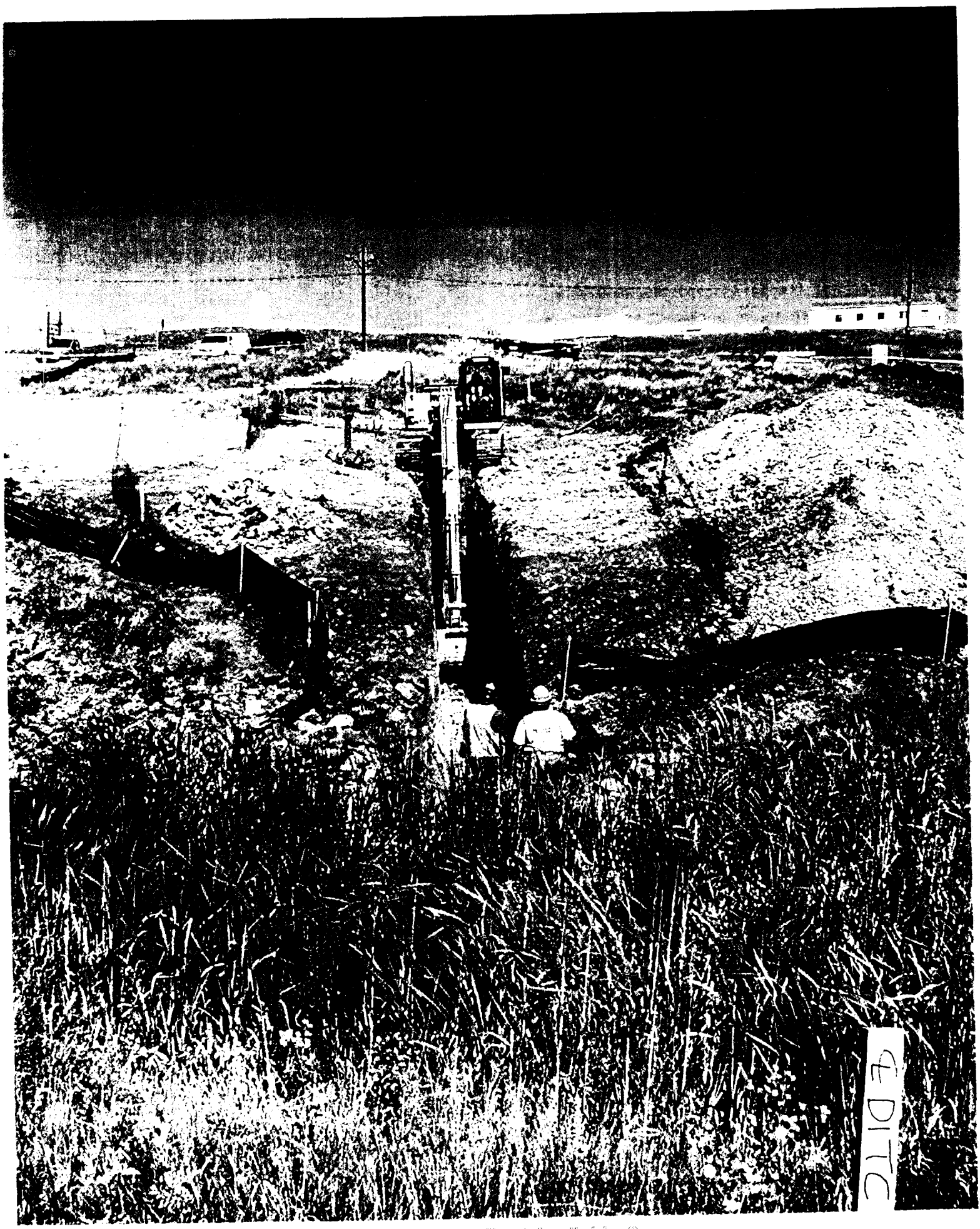
DOE 2000, *Site-Specific Construction Project Operable Unit 1 881 Hillside Area French Drain Decommissioning Project Work Plan*, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

**SITE LOCATION MAP**  
**AND**  
**AS-BUILT DRAWINGS**

**FRENCH DRAIN DECOMMISSIONING  
PROJECT PHOTOGRAPHS**



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# **NOTICE:**

**“BEST AVAILABLE COPY”**

**PORTIONS OF THE FOLLOWING  
DOCUMENT ARE ILLEGIBLE**

The Administrative Record Staff

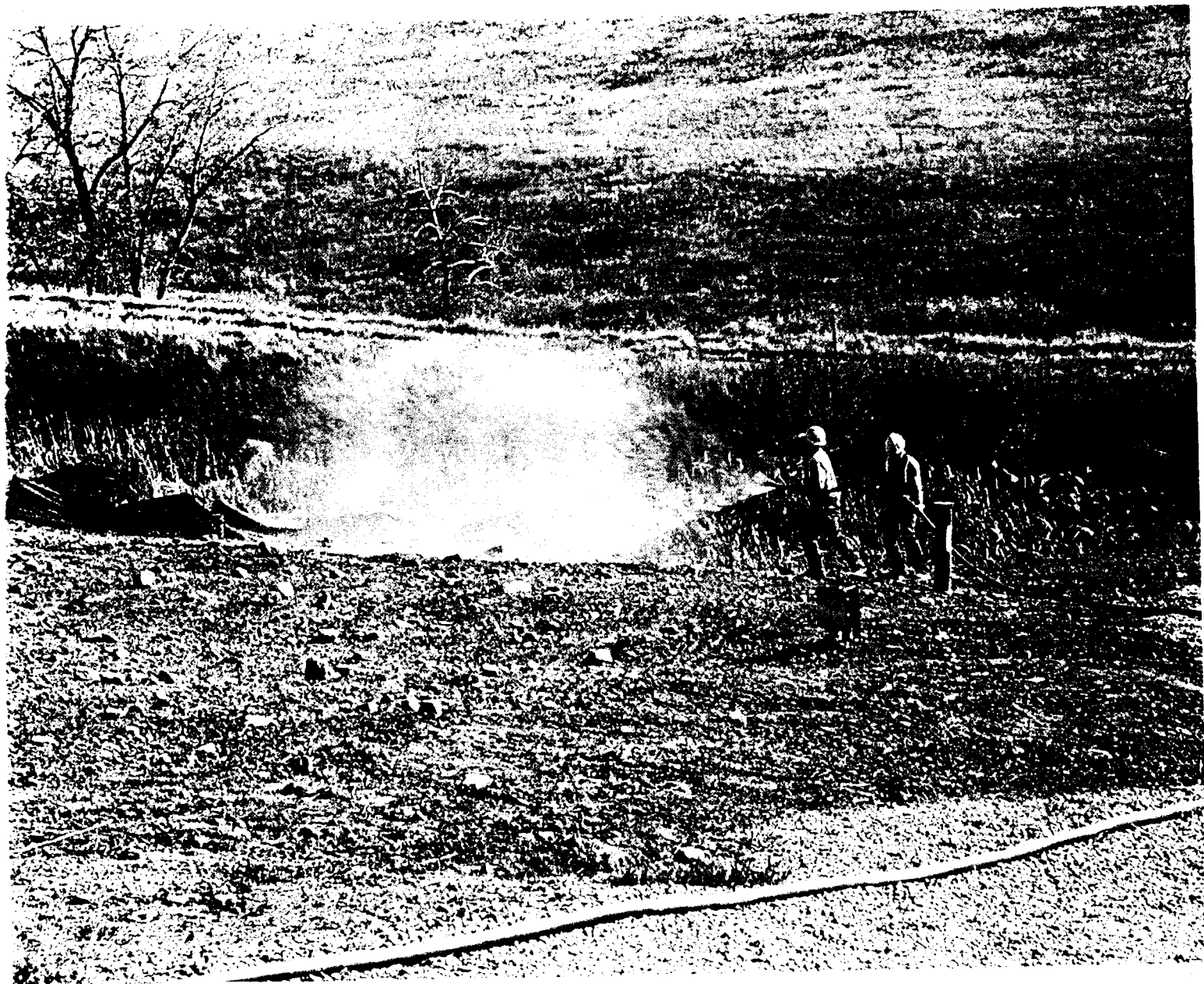














**FRENCH DRAIN DECOMMISSIONING  
WASTE DOCUMENTATION**

## ER Waste Tracking Form

Waste Package Number:	20-203	Generating Project WBS #:	1GAB0B04
IHSS/PAC/UBC Location:	OU1 French Drain Sump	Preliminary Waste Type:	NON
Fill Date:	6-Oct-00	Container Type:	R23
Container Qty:	1	Est. Waste Volume:	3/4 x 23 m3 = 17.3 m3
Subcontractor:	RMRS, RTG		
ER Project Manager:	Tracey Spence		

### Notes

#### Inventory of waste in Container 20-203:

2, plastic bags containing estimated 20 wet chem-wipes, 3 wet towels, 20 nitrile gloves, 4 wet absorbant pads, 3 plastic scoops, and 2 leather gloves;  
 5 stainless steel electrical control panels attached to Unistrut support members;  
 Cutoff sections of 2" and 3" diameter PVC pipe (estimate 20-30 linear feet);  
 Approximatley 25 3-foot lengths of rebar;  
 Insulated copper wiring and other electrical cable;  
 2, 4-inch diameter submersible sump pumps;  
 2, 12-foot lengths of 1-1/2" diameter PVC pipe;  
 2, 5-foot lengths of 4" diameter galvanized steel pipes with adaptor collars;  
 2, 6-foot lengths of 12" diameter steel casings;  
 2, 12" diameter pump well heads (green);  
 1, 6' x 4' stainless steel door for concrete vault;  
 1, 3-gallon metal can 1/3 filled with grout;  
 1, 15-foot length of 1" diameter stainless steel pipe;  
 Approximately 40 feet of silt fence with wood stakes attached;  
 1, metal chair;  
 2, cinder blocks;  
 Yellow plastic caution tape;  
 1, 20-foot length of new 4" diameter HDPE pipe with filter sock;  
 1' 8-foot length of platic orange construction barricade fence;  
 5, 10-foot sections of new Tensar HDPE Geogrid;  
 4, concrete filled guard posts (bollards) with concrete bases attached;  
 Cutoff sections of 1" and 3" diameter plastic coated steel conduit (estimate 40 linear feet);

#### Waste Type Codes

#### Description

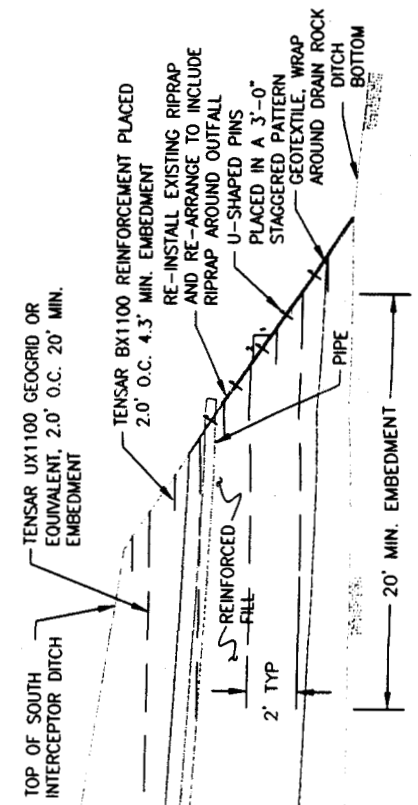
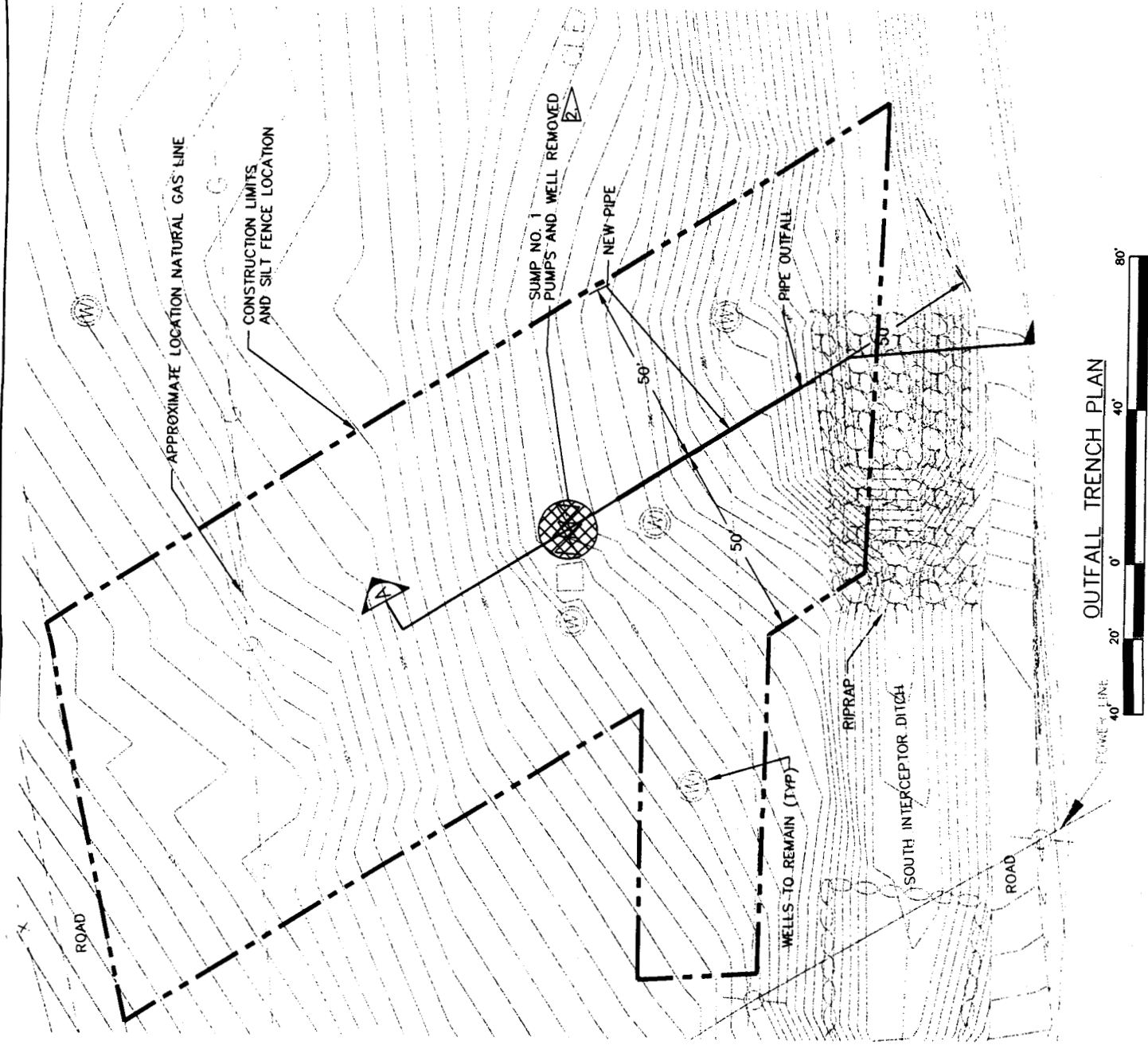
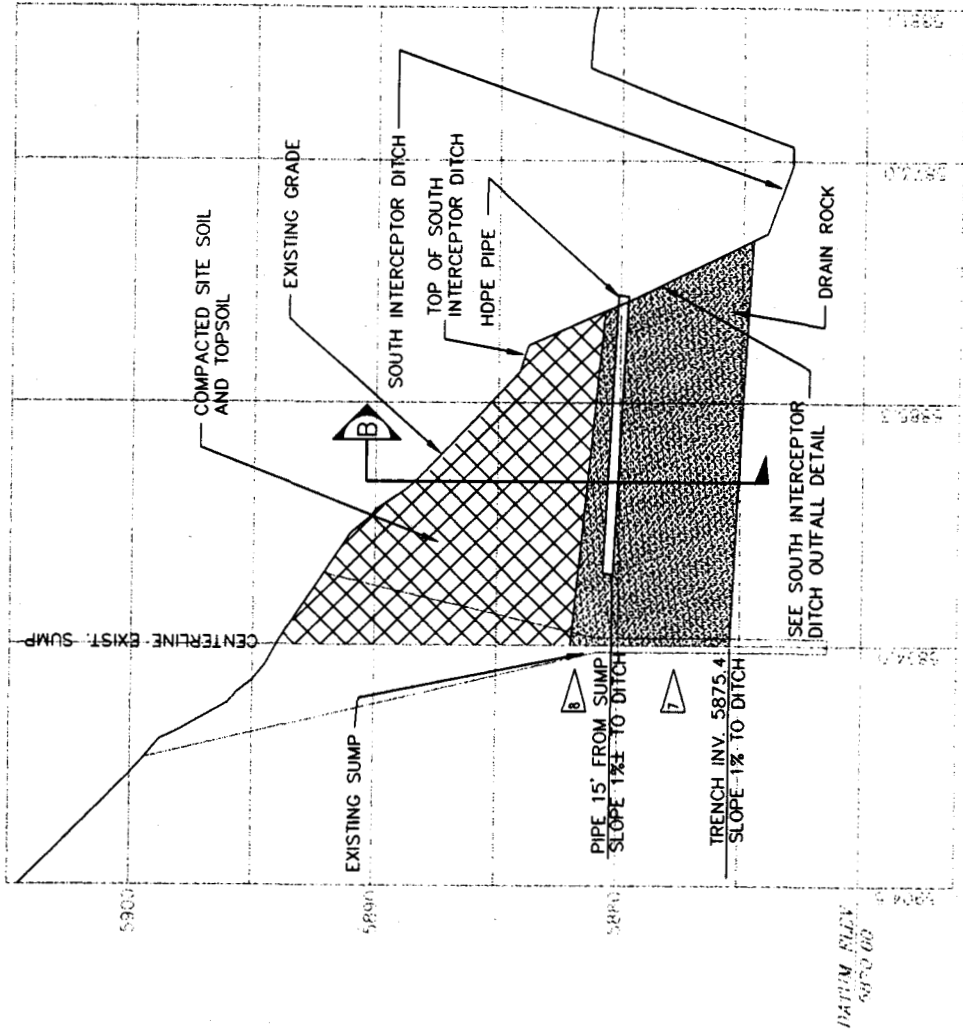
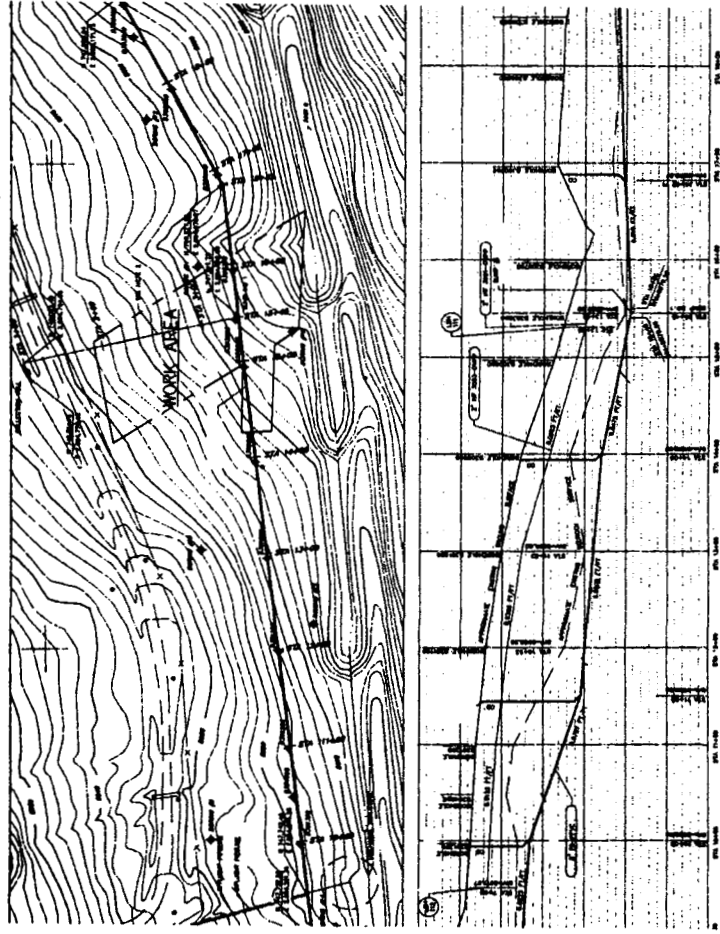
LLW	Low Level Radioactive Waste
LLM	Low Level Radioactive, Hazardous Mixed Waste
HAZ	Non Radioactive, Hazardous Waste
TRU	Transuranic Waste
TRM	TRU Hazardous Mixed Waste
NON	Non-radioactive, Non-hazardous Waste
TSC	Straight TSCA Regulated Waste

#### Container Type Codes

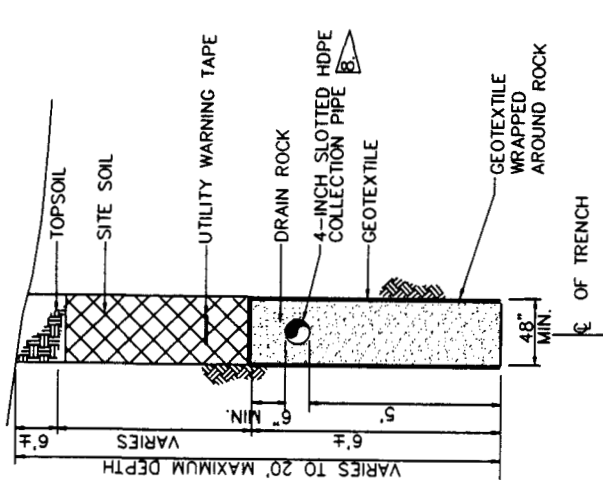
#### Description

CAR	Cargo
GON	Gondola
LLW	55 Gallon Drum (LL/LLM)
MFL	Metal Full Crates
MHF	Metal Half Crates
POC	55 Gallon Drum + Pipe Overpack (TRU/TRM)
R12	Rolloff (12 m3)
R23	Rolloff (23 m3)
S11	Supersack - Pond Sludge (1.1m3)
S14	Supersack - Sewage Sludge (1.4m3)
S74	Supersack - ER Waste (7.4m3)
TBX	TRU Standard Boxes (TRU/TRM)
TRU	55 Gallon Drums including rigid liner (TRU/TRM)
WFL	Full Wood Crate (LL/LLM/SCO)
WHF	Half Wood Crate (LL/LLM/SCO)



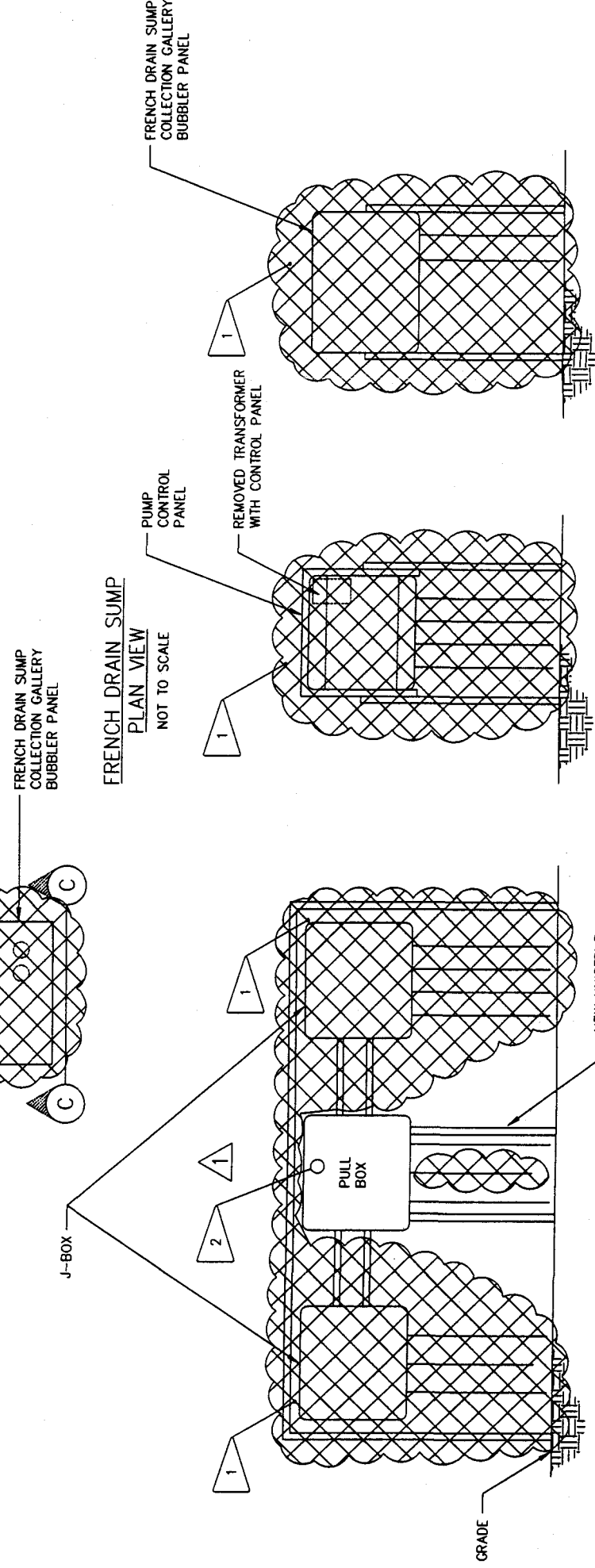
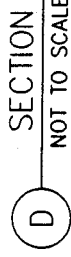
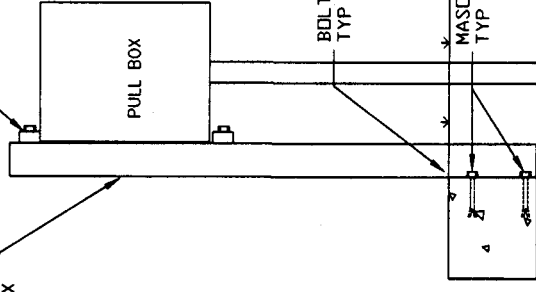
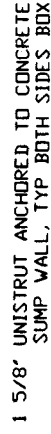
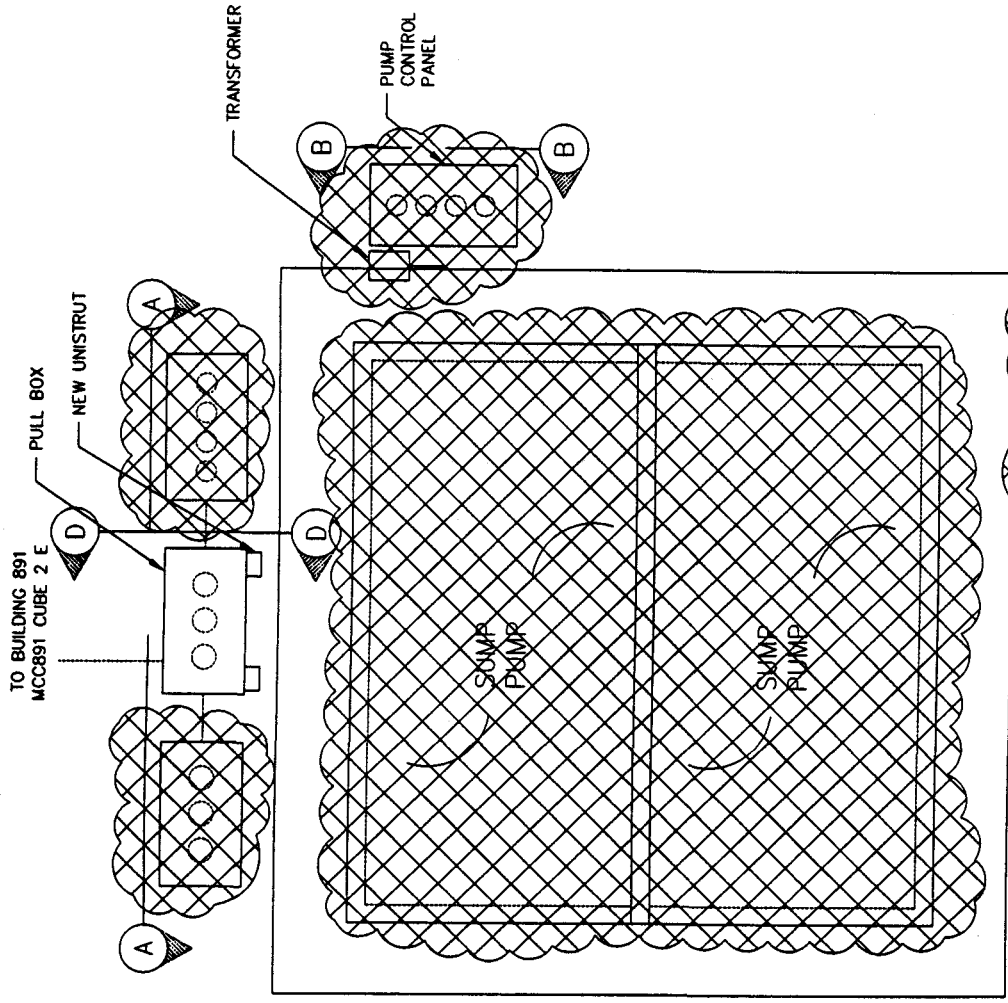
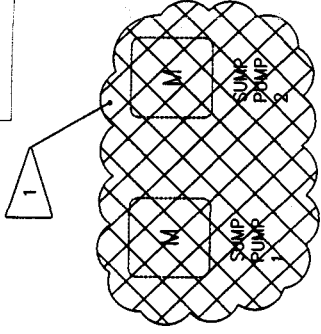
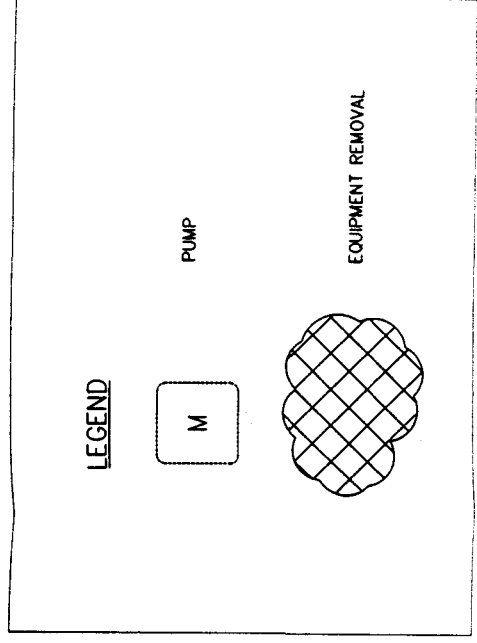


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- NOTES:
1. COORDINATES SHOWN ARE STATE PLANE SYSTEM. SEE DRAWING 38548-X030 FOR CONTROL POINTS.
  2. SEE ALL PROJECT DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL DETAILS.
  3. ALL WELLS REMAINED.
  4. SUBCONTRACTOR STAYED WITHIN CONSTRUCTION LIMITS SHOWN AND INSTALLED SILT FENCE AROUND PERIMETER OF CONSTRUCTION AREA. SUBCONTRACTOR INSTALLED HAY BALE BARRIER IN SOUTH INTERCEPTOR DITCH TO PREVENT SEDIMENT FROM CONSTRUCTION AREA FROM TRANSPORTING DOWN DITCH.
  5. ALL EXCAVATED SOIL REMAINED WITHIN THE SILT FENCED AREA DURING CONSTRUCTION, AND SPREAD WITHIN THE CONSTRUCTION AREA UPON COMPLETION OF CONSTRUCTION.
  6. ALL DISTURBED AREAS REVEGETATED IN ACCORDANCE WITH PROJECT SPECIFICATIONS OR ROCKED.
  7. GEOTEXTILE INSTALLED AROUND ALL DRAIN ROCK AND AT ALL INTERFACES BETWEEN NEW DRAIN TRENCH AND EXISTING SUMP MATERIALS. NEW GEOTEXTILE WRAPPED AROUND NEW/OLD GEOTEXTILE INTERFACES TO ENSURE CONTINUOUS GEOTEXTILE COVERAGE BETWEEN SUMP/TRENCH INTERFACE.
  8. HDPE SLOTTED PIPE PROVIDED WITH A FILTER SOCK ALONG ENTIRE LENGTH AND ACROSS INLET END.

KEYWORDS		AS-BUILT DESCRIPTION		PROJECT/ACCT NO.	
1 SITE	2 PLAN	DESIGNED BY	DESIGNED BY	U.S. DEPARTMENT OF ENERGY	PROJECT/ACCT NO.
3	4	DESIGNED BY	DESIGNED BY	Rocky Flats Environmental Technology Site	
5	6	DESIGNED BY	DESIGNED BY	GOLDEN, COLORADO	
7	8	DESIGNED BY	DESIGNED BY	DECOMMISSION OUT	
9	10	DESIGNED BY	DESIGNED BY	OUTFALL TRENCH	
11	12	DESIGNED BY	DESIGNED BY	SITE PLAN AND SECTIONS	
13	14	DESIGNED BY	DESIGNED BY		
15	16	DESIGNED BY	DESIGNED BY		
17	18	DESIGNED BY	DESIGNED BY		
19	20	DESIGNED BY	DESIGNED BY		
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97	98	DESIGNED BY	DESIGNED BY		
99	100	DESIGNED BY	DESIGNED BY		



0	ISSUE	AS-BUILT DESCRIPTION	J30FDR00 PROJECT/MCT NO.
KEYWORDS		DESIGN COMPANY:	U.S. DEPARTMENT OF ENERGY
TELEGRAPHICAL	TOLERANCES FRACT. ± — ANGLE ± — RND BY — DEC. ± — D. WOODS CHECKED BY — APPROVED BY —	B. MAYVILLE B. MAYVILLE D. WOODS	ROCKY FLATS OFFICE GOLDEN, COLORADO
2PLAN	UNLESS NOTED OTHERWISE		Rocky Flats Environmental Technology Site
3REMOVAL			GOLDEN, COLORADO
4.			
5.	REMOVE SURFS AND TOP SOIL		DECOMMISSION QUT1 881 HILLSIDE AREA FRENCH DRAIN
MISC / FACILITY	SHARP EDGES		ELECTRICAL SUMP REMOVAL
RNDY / MELA	NET ASSEMBLY		DETAILS
—	SCALE: AS NOTED		
END COORD. ACCL AND		SIZE	DRAWING NUMBER
—		D	38548-0750
—			ISSUE
—			A